

ENVIRONMENTAL CONTROL OF A TAXONOMIC
CHARACTER SEPARATING HETEROOTHECA S. STR.
FROM CHRYSOPSIS

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Harms (1965a) recently discussed a diagnostic character, in addition to epappose ray florets, which distinguishes *Heterotheca* s. str. from *Chrysopsis*. He noted that in *Chrysopsis* there is a progressive reduction of the petiole length with no enlargement of the petiole bases from the lower to the upper leaves, whereas in *Heterotheca* the sequence from the lower petiolate to the upper sessile leaves is characterized by progressively more expanded petiole bases in successive leaves, resulting in auricles which become increasingly expanded and continuous until they merge with the leaf blade proper, obscuring all traces of the petiole. Hybrids between *Heterotheca latifolia* Buckl. var. *macgregoris* Wagenkn. and *Chrysopsis berlandieri* Greene were found to be intermediate in this character (Harms, 1965b).

Several workers have noted a difference in leaf form between spring-collected and fall-collected *Heterotheca* s. str. Benke (1928) described *H. subaxillaris* var. *petiolaris* with leaves which were nearly all petioled except in or near the inflorescence from a plant collected at Galveston, Texas, on March 12, 1928. The petioles were obscurely or not at all dilated at base; the casual aspect of the population from which the type was taken reminded Benke of *Chrysopsis*.

Wagenknecht (1960) noted that, at the southern limits of its range, occasional plants of *H. latifolia* survive mild winters and flower again during the spring and early summer. The spring forms were found to be much shorter than the fall ones, being, in extreme cases, rosette forms with a short, branching inflorescence. The flowers were smaller and all the leaves below the inflorescence were characteristically petiolate and dilated not at all or only slightly at the base.

January-flowering and October-flowering specimens from a population of *H. subaxillaris* (Lam.) Britt. & Rusby which

flowers year-round on Bogue Barrier in North Carolina (Burk, 1961) were recently compared. The January-flowering specimens were found to have markedly larger flowers than specimens collected in flower in October. The lower leaves of the January-flowering specimens were still present, long-petioled, and without auriculate petiole bases except near the inflorescence.

Plants of *Heterotheca* s. str. may be easily propagated by stem cuttings. In a study of morphological variations of clonal plants of *H. subaxillaris*, the seed of which had been obtained from Padre Island, Texas, Nah (1965) showed that the production of leaves with auriculate-clasping petiole bases is photoperiodically determined. Clonal plants were raised for three months under long day (dawn to 10:00 P.M.) and short day (8:00 A.M. to 5:00 P.M.) conditions in the plant house at Smith College. None of the plants flowered during this period; their stems grew, however, well over a foot in height under the experimental regime. The plants on short day developed long-petioled leaves without auriculate petiole bases; the leaves of these plants tended to be larger than those of the long day plants. The stems grew taller on short day and there was no loss of basal leaves. The clonal plants raised on long day developed leaves with well-developed, auriculate-clasping petiole bases; there was a marked loss of basal leaves from the stem of these plants.

The species of *Heterotheca* s. str. are notoriously variable plants which, as several experiments have shown (Burk, 1961; Nah, 1965; Pinson, 1965), produce marked environmentally-induced forms. Valid criteria separating the taxa are difficult to obtain, and a leaf character which separates *Heterotheca* s. str. from the closely allied genus *Chrysopsis* is quite useful. However, as a diagnostic character, it must be used cautiously in identifying plants from areas where flowering on short day lengths might occur naturally or in evaluating *Heterotheca* × *Chrysopsis* hybrids grown on such regimes.

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